ARCTIC INSTITUTE OF NORTH AMERICA
TECHNICAL PAPER NO. 26

ARCHEOLOGICAL STUDIES ALONG THE PROPOSED TRANS-ALASKA OIL PIPELINE ROUTE

By

JOHN M. CAMPBELL

PUBLISHED NOVEMBER 1973

THE ARCTIC INSTITUTE OF NORTH AMERICA

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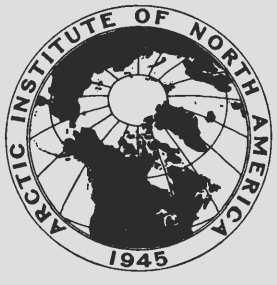

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ABSTRACT

This paper analyzes some of the data obtained during the archeological survey of the proposed trans-Alaska pipeline route. Over 200 archeological sites were found during the survey.

Four observations are made on the scientific value of the archeological survey: (1) many of the discoveries were made in regions where archeologists had not worked before, thus providing a new geographical dimension to the understanding of Alaskan prehistory; (2) artifact assemblages from some of the sites represent prehistoric or historic cultural phases which have not previously been reported; (3) many of the finds shed new light on the long-standing archeological problems concerning the origin and distribution of Alaskan Eskimos and Indians; and (4) some of the sites permit new assessments of the characteristics of Alaskan societies during the transition between old and modern cultures.

ARCHEOLOGICAL STUDIES ALONG THE PROPOSED TRANS-ALASKA OIL PIPELINE ROUTE

John M. Campbell*

Introduction

In early 1970, a committee of anthropologists—all Fellows of the Arctic Institute of North America—was formed to advise the Bureau of Land Management, U.S. Department of the Interior, on matters pertaining to archeological finds along the proposed oil pipeline route of the Alyeska Pipeline Service Company from Prudhoe Bay to Valdez, Alaska. Since then, members of the committee have evaluated the surveys and excavations of archeologists under contract to Alyeska for compliance with the U.S. Antiquities Act (34 Stat. L. 225, June 8, 1906) and with more recent regulations for the protection of archeological sites on federal lands.

This paper describes and evaluates the work of the Alyeska contract archeologists with reference to these U.S. laws and regulations. It also comments on the value of this work to our knowledge of the aboriginal peoples of Alaska.

The proposed pipeline route is about 800 miles long, with some 600 miles of it in unpopulated wilderness areas which are not accessible by roads. In spite of the route's remoteness, however, during the summers of 1970 and 1971, crews of archeologists from the University of Alaska and from Alaska Methodist University, under contract to Alyeska, searched nearly all the pipeline right of way for archeological sites, mapped the location of those found, and excavated many of them. The value of this work is important to the study of Alaskan prehistory, not only with regard to the distances covered and to the number and variety of localities examined, but also with regard to the scientific value of the archeological remains uncovered.

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Acknowledgments. Many individuals are due thanks for the work reported on in this paper. Foremost would be the committee members, who did most of the evaluative work of the Alyeska archeologists. These include Dr. Henry B. Collins, Jr., U.S. National Museum; Dr. Elmer Harp, Jr. (committee chairman), Dartmouth College; Dr. Helge Larsen, Danish National Museum; Dr. Robert A. McKennan, Dartmouth College; Dr. William E. Taylor, Jr., National Museums of Canada; Dr. James W. VanStone, Field Museum of Natural History; and the author (committee executive secretary), University of New Mexico. (Since the committee's formation, Dr. Collins and Dr. VanStone have resigned because of the press of other duties.)

Others who were involved in this project include Dr. Herbert L. Alexander, Jr., University of Alaska; Dr. John P. Cook, University of Alaska; Mr. Robert C. Faylor, Arctic Institute of North America, Washington; Dr. Frederick Hadleigh-West, Alaska Methodist University; Mr. David Henderson, Alyeska; Mr. Morris J. Turner, Bureau of Land Management, Anchorage; and Dr. William B. Workman, Alaska Methodist University.

Work of the Alyeska Archeologists

In February 1970, at the request of Mr. Turner, the author accompanied Dr. Alexander to the region of Galbraith Lake in Atigun Valley in the north-central Brooks Range (see maps). The purpose of the excursion was to examine and report on known archeological sites in the region as they related to current or planned Alyeska construction activities. Dr. Alexander was the only archeologist to have worked in Atigun Valley, he having surveyed and excavated there before the region was selected as part of the proposed pipeline route. During the two days we spent at Galbraith Lake, the temperature varied between -35° and -40°C, but much of the ground surface was blown clear of snow. With Dr. Alexander's knowledge of the region, however, we were able to assess potential damage to important archeological sites.

Earlier, in late summer and fall of 1969, Dr. Cook and Dr. Workman, in voluntary capacities, visited a few areas along the pipeline right of way, with Alyeska (then known as the Trans-Alaska Pipeline System) providing air transportation on a space-available basis. This work was aimed at allowing Dr. Cook and Dr. Workman to become better acquainted with the terrain to be traversed by the route and to demonstrate that archeological materials actually occurred in the path of the proposed pipeline.

Both objectives were achieved, although no archeological sites were discovered in those areas visited by Dr. Workman along the southern part of the right of way. On the northern part, Dr. Cook and his assistants confirmed that a number of archeological localities previously recorded by Dr. Alexander in Atigun Valley lay on or near the pipeline route. At Hess Creek, Dr. Cook discovered Site Y-1 (Designation 91 on Map 2d) in the right of way of the Alyeska haul road. Site Y-1 yielded several stone tool types, including burins and microblades. (A burin is an incising tool fashioned from a stone flake, the cutting or incising edge of which was formed and sharpened by striking off small spalls according to a particular technique. A microblade, used as a cutting, penetrating, or scraping implement, is a small parallel-sided flake struck from a stone core which had been prepared according to another specific technique.)

The presence of burins and microblades in Site Y-1 implied that the locality was quite old. As presently known, neither of these artifact types was in use in northern North America in recent centuries. They are, however, common in the stone tool assemblages of a number of societies which existed in the American Arctic and Subarctic during a period that extended from one thousand to several thousand years ago. Site Y-1 was therefore apparently old, but its artifact assemblage could not be readily identified with any specifically known prehistoric Alaskan or Canadian culture. Its discovery thus encouraged the belief that careful searches along the pipeline right of way would result in valuable new archeological finds.

As intended, intensive contractual archeological surveys by crews from the University of Alaska and Alaska Methodist University were begun early in the summer of 1970. Surveys, as well as preliminary excavations of a number of the sites discovered, were run throughout that summer, and were resumed the following spring shortly after the right of way became clear of snow. These surveys were essentially completed in the fall of 1971. If the pipeline is eventually constructed, the surveys will represent the first major phase of Alyeska archeological field work.

Because of other professional commitments by archeologists from Alaska Methodist University, and because more student field assistants were available at the University of Alaska, the original plan of reconnaissance was revised during the summer of 1970. Crews from the latter institution, under the direction of Dr. Cook, and Dr. Alexander, were henceforth responsible for the work from Donnelly Dome (Map 1) northward, while a crew under the direction of Dr. Workman surveyed south of Donnelly Dome.

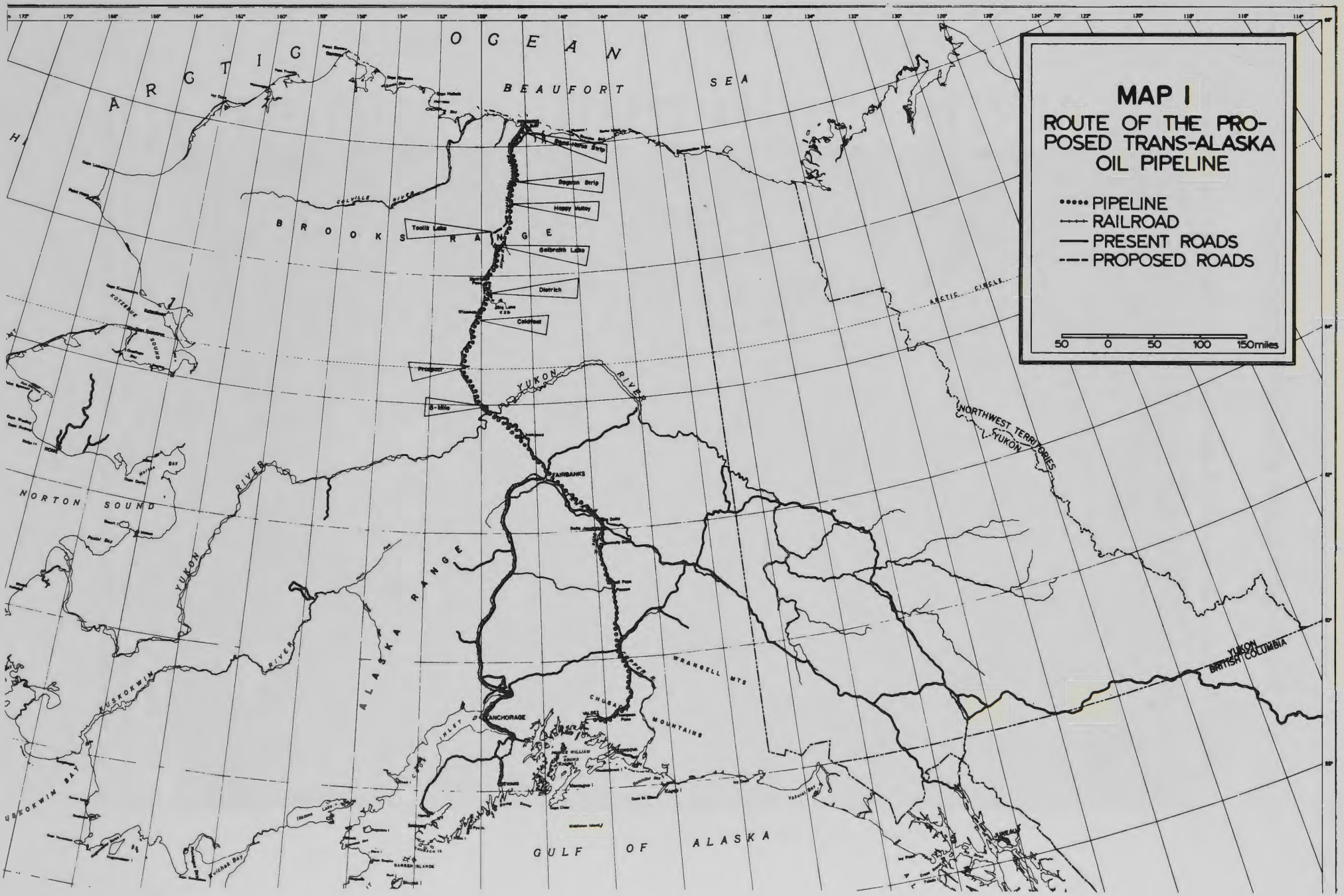
The field work, including both reconnaissance and excavation, was performed with the aid of a variety of transport provided by Alyeska. According to the need and availability, ground vehicles, boats, conventional aircraft, and helicopters were employed to move and support the crews. At times helicopters were directly used in searching for sites. A number of archeological sites were found from helicopters, although few of them were actually identified from the aircraft. Instead, likely archeological localities were first observed from the air, and the existence of actual sites was confirmed by ground examinations. On the other hand, low-level helicopter reconnaissance permitted the crews to exclude, at least temporarily, certain types of terrain from on-the-ground surveys. Such terrain included swamps, wet ground, and precipitous slopes.

Foot travel, however, was the single indispensable technique used in searching for sites. In this manner, more than 80 percent of the total length of the northern section of the route was carefully examined. In addition, in the northern section, because of the far larger numbers of field assistants, and with the approval and cooperation of Alyeska, some surveys were conducted beyond the confines of the right of way. (For the reasons noted below, considerably less than 80 percent of the southern section was reconnoitered on the ground.)

As it occurred, some 210 archeological sites were found in the longer northern section, and only one (a single artifact) was encountered in the much shorter southern section. In part, this disparity is due to the comparative numbers of archeologists who worked in the two sections. In the southern area, Dr. Workman was accompanied by only two assistants, while Dr. Cook and Dr. Alexander deployed more than 35 crew members.

Start of excavation of Nunamiut Eskimo site in upper Atigun Valley (Designation 47 on Map 2b).

Pipe depot near Valdez.


MAP I
ROUTE OF THE PROPOSED TRANS-ALASKA OIL PIPELINE
PIPELINE
RAILROAD
PRESENT ROADS
PROPOSED ROADS
50 0 50 100 150miles
ARCTIC OCEAN
BEAUFORT SEA
BROOKS RANGE
Prudhoe Bay
Sagavanirktok River
Sagwon Strip
Happy Valley
Toolik Lake
Galbraith Lake
Dietrich
Coldfoot
Prospect
8-Mile
YUKON RIVER
FAIRBANKS
NORTHWEST TERRITORIES
YUKON
NORTON SOUND
YUKON RIVER
KUSKOKWIM RIVERS
ALASKA RANGE
WRANGELL MTS
ANCHORAGE
CHUGACH MOUNTAINS
GULF OF ALASKA
YUKON
BRITISH COLUMBIA

Mainly, however, the disparity is explained by the nature of the terrain in the two sections. In the southern area, the pipeline route south of Thompson Pass (Map 1) traverses either steep slopes or dense forests, or both. At lower elevations the dominant tree is Sitka spruce (*Picea sitchensis*); and in the vicinity of Valdez Arm, the southern terminus of the route, the stands of this species are invariably accompanied by a thick understory of lesser trees and brush.

Unquestionably this area was occupied by societies in former times. In fact, we believe that for several hundred years before the historic period it had been part of the territory of the Chugachmiut, one of the southernmost groups of Eskimos in North America. Nevertheless, neither the Chugachmiut nor other peoples who may have preceded them were inclined to settle on the precipitous mountain slopes. In the densely forested localities, the discovery of archeological sites which may lie along the right of way must await further clearing of the vegetation.

Similar problems were encountered in most of the remaining southern section. From the summit of Thompson Pass northward to Isabell Pass (Map 1), the pipeline route crosses the Copper Basin, the ancestral territory of the Atna Indians. Here, most of the land is covered with more open forests, and depending upon terrain conditions the dominant tree is either white or black spruce (*Picea glauca* or *Picea mariana*). The latter species grows in wet ground which is often densely carpeted with sedge tussocks. Much of the right of way in the Copper Basin passes through black spruce forests which, during at least the past several centuries, were occupied sparsely, if at all, by human communities.

The white spruce forests have been more favored by man, both as places of settlement and as routes of travel. Further, because of the dryness and the relatively thin ground cover, it is easier to search for archeological sites in these woodlands. In the Copper Basin, much of the pipeline route also lies in this type of terrain. Ethnographic studies as well as archeological surveys have established, however, that in late prehistoric and early historic times the main communities of the Atna Indians lay at various distances to one side or the other of the proposed right of way.

This does not mean that during pipeline construction no additional archeological sites will be found in this large region. On the contrary, we expect that at least a few will be discovered. Since planned construction in this section will involve trenching to depths of several feet, sites dating back thousands of years may be encountered. Any such deeply buried archeological remains may have been deposited before the forests of the Copper Basin developed in their present positions. Possibly, therefore, sites will be found in localities now occupied by black spruce forests, marshes, and other types of ground which in more recent centuries have been unsuitable for habitation.

From Isabell Pass to Donnelly Dome (Map 1), the northernmost end of the southern section, the pipeline route lies within the traditional territory of the Tanana Indians. In this area much of the route traverses rather high, rolling ground on the watershed of the Delta River. Here, there are few trees, and the ground surface is often only sparsely vegetated.

During historic times, and probably much farther into the past, the valley of the Delta River has served as a major route of migration for a large herd of caribou (*Rangifer arcticus*), and formerly the Tanana Indians hunted these animals in the vicinity of Donnelly Dome. Several archeological sites were found

Excavation continues at Nunamiut site. Note the method of identifying areas within the site.

Nunamiut Eskimo site in Atigun Valley.

Evaluation of individual site area prior to excavation.

there in previous years (before the pipeline work began) by crews from both universities, and in this same area the Alyeska archeologists discovered a number of stone tools on the ground surface. While the artifacts from these sites appear to be relatively old and do not resemble implements known to have been used by the Tanana Indians, they were most probably manufactured by ancient interior Alaskan Indians, perhaps even by the remote ancestors of the Tanana people. Probably, further work on the Delta River watershed will result in the discovery of additional sites. In any event, because it occupies an important caribou migration route, the area between Isabell Pass and Donnelly Dome is the most promising part of the right of way in the southern section.

From Donnelly Dome, the pipeline route continues across the old Tanana territory to a point some miles north of the Yukon River. It then crosses the westernmost part of the late prehistoric and early historic range of the Kutchin Indians. Finally, from slightly south of the Brooks Range divide northward to Prudhoe Bay, the route cuts through lands which until only the past several decades were occupied by Eskimos, mainly by bands of the inland-dwelling Nunamiut tribe. Nearly all of the Eskimo territory lies north of the tree line, and most of it is tundra that is dominated by several species of the sedge *Eriophorum*, commonly known as cotton grass. Southward from the tree line the country is generally forested, and again the dominant trees are either white or black spruce. These forests, though, are generally even more open than those farther to the south, and within this northernmost wooded area there are numerous large tracts of hills upon which grow few if any trees.

In the northern section, the archeological surveys resulted in the discovery of no "designated" sites between Donnelly Dome and about Livengood. Many were found north of Livengood, with most of them being encountered in the valleys of the Atigun, Koyukuk, and Sagavanirktok rivers. The reasons for the scarcity of discovered sites in the southern part of the northern section are much the same as those in the Copper Basin and the Thompson Pass-Valdez Arm areas; namely, dense vegetation, wet ground, or other unsuitable terrain.

North of Livengood, archeological remains were discovered most abundantly in open or relatively open localities. Within the forest zone, these localities often occupy the tops or sides of ridges, or of glacial features such as moraines. North of the tree line, many of the sites occur on elevated terrain, from which the people could view large sectors of the surrounding country. Other sites, in both the forest and tundra zones, lie on or near the banks of streams or lakes, and some important archeological localities in the tundra part of the route are situated near willow thickets (north of the tree line the widely scattered willow thickets were sources of fuel in former times).

While 210 sites were discovered in the northern section of the pipeline route, only 143 were described in detail. (The locations of 181 sites appear on Map 2.) Each of the other sites consisted of only one or a few artifacts, or a single feature. (An archeological feature is a nonremovable or nonportable artifact or group of artifacts, such as house foundations, fireplaces, and cache pits.) As an example, among the undesignated sites was a piece of caribou antler, found lying on the tundra, which showed evidence of having been cut with a knife. In the strictest sense this find qualified as an archeological "site." In this case, and in others like it, while the artifact was collected and recorded in a field notebook, it was not assigned a site number.

It is necessary to explain, however, that the crews considered all "sites" to be important, pending a thorough examination of the locality. Indeed, many of the sites which produced relatively abundant archeological remains were first revealed by the discovery of a single implement, stone flake, or fragment of antler or bone lying on the surface of the ground. Further, the archeologist used his judgment in assessing the importance of a site. In some instances, this led to one implement, or to a number of stone flakes occurring together, being assigned a site number and described in detail.

When preliminary examination proved that a particular site locality warranted detailed study, it was given an alphanumeric designation. As depicted on Map 2, each such site was noted by a letter followed by a numeral. The letter refers to a geographical area, and the numeral refers to the chronological position in which the site in that area was cataloged. For example, S-67 designates the 67th described site in the Sagavanirktok area. The letter K designates the Koyukuk area; Y the Yukon area. When Map 2 was redrawn for publication, designation numbers were used to facilitate the reader in identifying site locations.

Each of these designated sites was recorded in three documents. First, a site's essential characteristics were noted on a site survey form. Second, its description was recorded in a field journal. Third, a summary statement was forwarded to the Alyeska organization in Anchorage. In most instances, summaries of a number of sites were combined in a single report. These range in length from 2 or 3 pages to more than 450 pages, and they often contain interpretive as well as descriptive comments. The interpretive remarks treated estimated ages of the sites, possible relationships with previously reported far northern archeological materials, and similar subjects.

In addition to recording the sites, the Alyeska archeologists also described the surveys. The survey reports, which noted both the sites discovered and the areas in which no sites were found, were also forwarded to the Alyeska organization. Alyeska, in turn, sent copies of the site and survey reports to the Anchorage office of the Bureau of Land Management, from whence they were distributed to the Arctic Institute committee.

As executive secretary of the committee, the author assumed major responsibility for evaluating the reports, although other committee members assisted. In the evaluations submitted in writing to the Bureau's Anchorage office, we were primarily concerned with the thoroughness of the field work and with the manner in which the archeological materials found were recorded and preserved.

Because of the delay in awarding the final construction permit to Alyeska, the archeologists gained the necessary time in which to reconnoiter the pipeline route and to examine the sites discovered. As evident in the reports written by the Alyeska archeologists, and as confirmed by our own field visits, the surveys were carefully conducted, and the investigations of the sites discovered were nearly always meticulous. In addition to the use of excavation techniques in which the location of each artifact and feature was precisely recorded, sites and areas within sites were mapped and photographed. These techniques were also employed at sites in which archeological remains occurred only on the ground surface.

Equally careful treatment was accorded the artifacts recovered. Each specimen was marked or tagged with a field number, and then recorded in a note-

Demonstration of care used in removing artifacts during excavations.

book according to the site in which it was found and its position within the site. Artifacts of wood, bone, antler, and perishable materials were often treated in the field with preservative chemicals. Further preservative measures were subsequently employed at the University of Alaska, where all of the specimens were cataloged and stored as part of the university's permanent archeological collection.

In sum, the members of the Institute Committee found that the work of the Alyeska archeologists was generally excellent, and that unquestionably the conditions of the Antiquities Act and of other appropriate federal regulations were met. In fact, in their attention to detail and to the use of careful archeological techniques, the crews extended their studies well beyond the usual limits of salvage archeology. Much of this work was accomplished on the initiative and skill of graduate and undergraduate students from the University of Alaska as well as from other universities. They, as well as the professors who directed them, are to be commended, and it is noteworthy that several of these students have incorporated the results of their pipeline archeological studies in theses or dissertations submitted for advanced degrees.

The Archeological Sites

This section presents an overview of the nature of the archeological localities along the pipeline route. Ages and physical characteristics, and some of the human activities they represented are noted. In addition, a few of the sites are discussed in reference to their importance toward a more complete understanding of Alaskan cultural history. Both the descriptions and the interpretations are to be regarded only as samples of what was discovered. The interpretations include my own as well as those of the Alyeska archeologists, and they must be considered as tentative. During the next few years, the detailed results of much of the pipeline archeology will likely be published in journals and monographs. Meanwhile, within the anthropological profession, the studies have encouraged further archeological work in numerous parts of Alaska.

Physical features. Nearly all the sites found are shallow. Cultural remains seldom occurred more than a few inches below the ground surface, and only two localities—Site S-40 (Designation 7 on Map 2a) and a site in Atigun Valley previously discovered by Dr. Alexander but not included on the map—were clearly stratified. In archeological usage, this term refers to two or more cultural levels as they occur one above the other in a single site. In most stratified situations, the lowermost level is the oldest and the uppermost the youngest, a condition which permits relative dating.

In the Far North, however, the mechanical qualities of permafrost in combination with seasonal freezing and thawing of the upper soils (the active layer) quite often cause either reversing or mixing of different archeological materials which were deposited in a single site at different points in time (Campbell 1966). Further, in the Arctic and in many parts of the Subarctic, soil deposition is extremely slow, with the result that archeological remains of different ages and cultural affiliations may occur together without intervening lenses or layers of soil.

A number of such sites, containing a cultural mixture of artifacts, were discovered along the pipeline route. On the one hand, distinctive concentrations of artifacts, representing different cultures or cultural phases, were horizontally separated in some sites. On the other hand, many site localities apparently contained only single components. (A single component refers to the debris left behind by members of one society who occupied the site during a relatively short period of time.) Therefore, while the Alyeska archeologists did not enjoy the advantage of working in vertically stratified localities in which cultural succession was clearly evident, the horizontal stratigraphy did permit the identification of a number of Indian and Eskimo societies which existed at different times in the past.

Several techniques were used in estimating the ages of the archeological localities. As examples, the presence or absence of certain perishable materials, the geological locations of the sites, and typological comparisons of artifacts with similar implements from dated sites elsewhere permitted assigning relative dates to some of the localities. For some sites, though, absolute dates were obtained. By far the most precise of these is that of an August 20, 1934 fragment of *The Christian Science Monitor* found in the ruins of an Eskimo house at Site S-81 (Designation 1 on Map 2a).

The oldest date for any of the sites discovered along the route is 8,590 (±150) B.P. This date was ascertained by the radiocarbon technique from charcoal found in Site S-10 (Designation 24 on Map 2b). The charcoal was associated with large stone blades and cores (larger but otherwise similar in technique of manufacture to the microblades and cores described earlier). While little can be said now concerning the ancient culture represented by the artifacts from Site S-10, they are the oldest yet discovered anywhere north of the Brooks Range divide which has been radiocarbon dated.

At least a few of the sites discovered by the Alyeska archeologists are perhaps just as old, if not older. To note only one example, Site S-111 (Designation 43 on Map 2b) produced a few fluted stone points. These distinctive artifacts are characterized by long, wide grooves (or flutes) on both faces, the result of the removal of flakes, again according to a deliberate and specific technique. Few fluted points have been found in the Far North; however, in other parts of North America they are common, and many of them have been assigned to the ancient Folsom or Clovis cultures which existed 10,000 or more years ago. [See Wormington (1957) for a summary discussion of fluted point sites and their ages.] Absolute dates are not available for Site S-111, but the site may well be somewhere near 10,000 years old. In any case, many of the sites span a long period of time.

Most of the archeological localities which appear on Map 2 represent settlements of one type or another. Among them at least several contained the tools and refuse of relatively large encampments which had been occupied by several families. In a few, the floors and outlines of the former dwellings were clearly revealed by the excavations. Other settlements or places of abode consisted of a single dwelling and its artifacts. Still others could be identified as small, temporary settlements by the types and numbers of tools, amounts of refuse, or the presence of charcoal, giving evidence that one or more people had camped there.

In addition, a number of the sites discovered do not reflect settlements. Among them are quarries, which provided chert, chalcedony, or other stone for toolmaking. Probably, they were visited briefly and infrequently. Others are locations which appear to have served mainly as lookouts and secondarily as manufacturing stations. Almost invariably, these sites occur on or near the tops of eminences, and they contain fragments of stone projectile points or other stone tools as well as numerous flakes, the debris of flint working. Usually, however, there is no evidence that people actually lived at these places in the sense that they established dwellings there. This interpretation is supported by ethnographic data from present-day Nunamiut Eskimos. Although the Nunamiut hunters are now armed with rifles, they still carry their toolmaking kits with them when they go to the tops of hills and ridges to watch for migrating caribou.

Scientific value. At least four observations can be made on the scientific value of the pipeline archeological discoveries. First, many of the discoveries were made in regions where archeologists had not worked before, thus they provide a new geographical dimension to our understanding of Alaskan prehistory. Second, artifact assemblages from some of the sites represent prehistoric cultures or cultural phases which have not previously been reported. Third, many of the finds shed new light on long-standing archeological problems concerning the origin and distribution of Alaskan Indians and Eskimos. Fourth, some of the sites permit new assessments of the characteristics of Alaskan societies during the transition period between old and modern cultures. This is not an exhaustive list of observations, but it does include some of the more important results of the archeological discoveries. Three examples are given below to illustrate the scientific value of Alyeska's work.

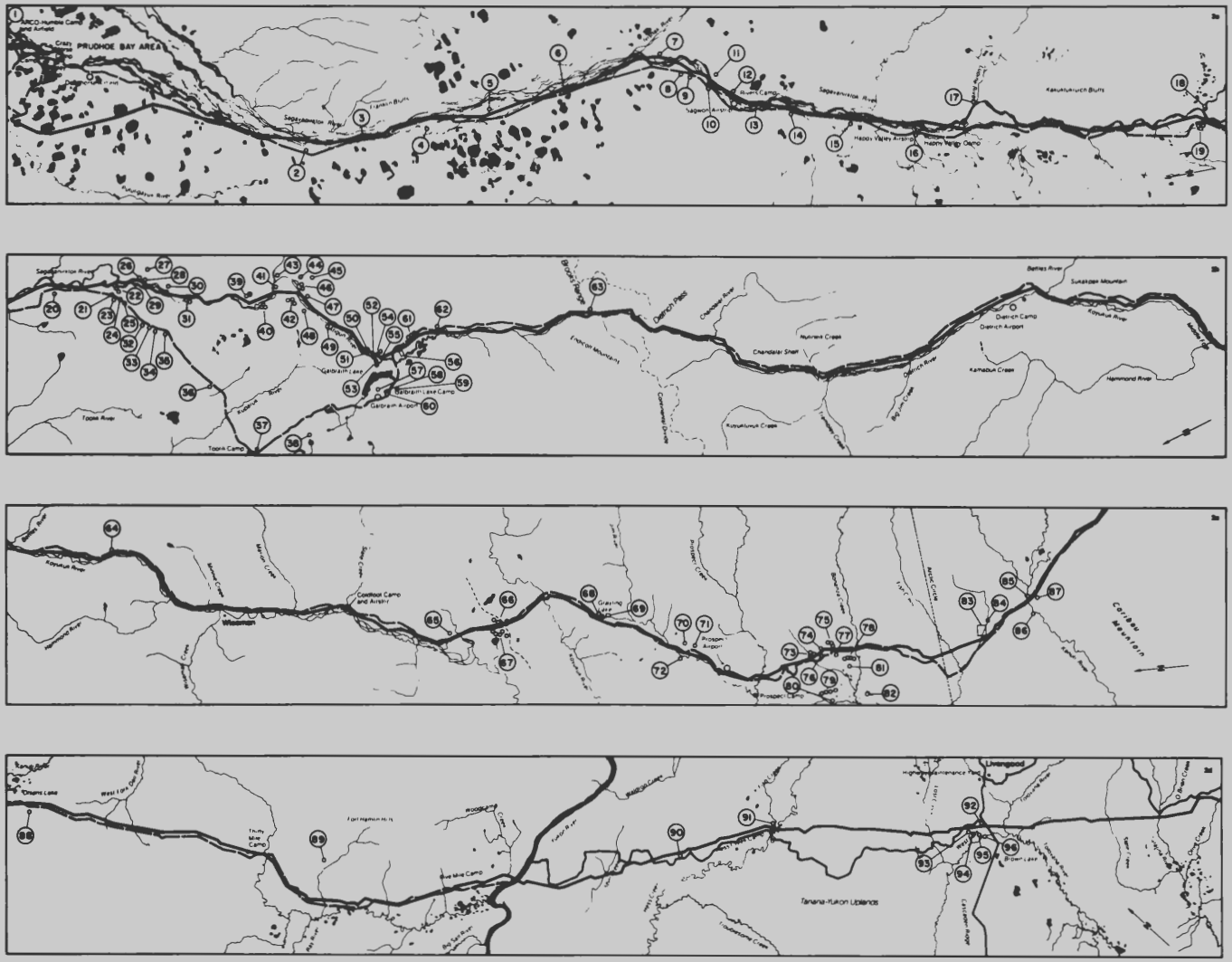
Example 1. During the past 50 years, extensive excavations in Canada and Alaska have resulted in a large body of data concerning the prehistory of the Eskimo. On the basis of this evidence, we now generally believe that the Eskimo culture originated in western and northwestern Alaska and in northeastern Siberia some 5,000 or more years ago. From those regions, it spread eastward to north and east Greenland and Labrador, and southward to Prince William Sound in Alaska.

Previous archeological work has shown that the various Eskimo groups have remained closely related in the sense of having shared a number of distinctive artifacts and features. The conclusion by archeologists that the widely scattered Eskimo bands were members of the same basic culture and that they had a common origin is supported by historic and ethnohistoric data. In recent times, all of them have shared the same or similar languages, social and political customs, religious practices, and manufacturing technologies.

The available data have implied that the Eskimo culture has generally remained quite separate and distinctive from northern North American Indian cultures; that the Eskimos and Indians have had different origins; and that, with a few exceptions, the Eskimos have occupied only the northern islands, the northern rim of North America (including the northernmost interior tundra), and the coastal regions of northeastern Siberia, while the Indians have inhabited the northern forests. A few Eskimos are known to have occupied northern forest areas, but in these relatively rare instances they are thought to have lived barely within the borders of the wooded zone. Therefore, we are especially interested to

MAP 2 ARCHEOLOGICAL SITES

TRANS ALASKA PIPELINE ROUTE



LEGEND

- PROPOSED PIPELINE
- PRESENT ROAD
- PROPOSED ROAD
- ARCHEOLOGICAL SITES

Scale of Miles
5 0 5 10

MAP DESIGNATION	CATALOG DESIGNATION	ALASKA SITE DESIGNATION
1	S 80	XBP 006
	S 81	XBP 005
2	S 93	None
3	S 92	None
4	S 78	None
5	S 75	None
6	S 43	SAG 001
	S 74	None
7	S 40 (S 41)	SAG 004
8	S 29	None
9	S 28 (S 30 S 38)	SAG 005
10	S 37	None
11	S 44	SAG 007
12	S 42	SAG 001
13	S 45	SAG 003
14	S 33	None
15	S 36	None
16	S 9	SAG 006
17	S 46	None
18	S 91	None
	S 31	None
19	S 32	None
	S 35	None
20	S 34	None
21	S 11 (S 101)	PSM 004
	S 57	PSM 013
	S 87	PSM 001
22	S 89	PSM 001
	S 90	PSM 001
23	S 79	PSM 035
24	S 10	PSM 050
25	S 71	PSM 034
26	S 86	PSM 008
27	S 110	PSM 007
28	S 96	None
29	S 85	PSM 008
30	S 52	PSM 016
31	S 14	PSM 027
	S 84	None
32	S 12	PSM 028
33	S 106	PSM 008
34	S 77	PSM 010
35	S 82	PSM 008
36	S 76	PSM 011
	S 1	PSM 037
	S 2	PSM 038
	S 3	PSM 037
37	S 4	PSM 047
	S 5	PSM 037
	S 6	PSM 046
	S 7	PSM 045
	S 8	PSM 044
	S 97	PSM 037
38	S 98	PSM 037
	S 99	PSM 037
39	S 13A	PSM 027
	S 13B	PSM 027
	S 95	None
	S 25	PSM 020
	S 15	PSM 025
40	S 26	PSM 015
	S 105	PSM 005
41	S 83	PSM 008
	S 20	PSM 023
42	S 48	PSM 017
	S 108	PSM 006
43	S 111	PSM 007
44	S 16	PSM 024
45	S 17	PSM 024
46	S 18	PSM 024
	S 19	PSM 023
47	S 107	PSM 006
48	S 54	PSM 015
49	S 53	PSM 015
	S 66	PSM 029
50	S 104	PSM 005
	S 47	PSM 017
	S 49	PSM 018
51	S 50	PSM 018
	S 51	PSM 018
52	S 60	PSM 030
53	S 59	PSM 030
	S 61	PSM 030
54	S 63	PSM 049
	S 67	PSM 036
55	S 65	None
	S 27	PSM 019
	S 55	None

MAP DESIGNATION	CATALOG DESIGNATION	ALASKA SITE DESIGNATION
56	S 58	PSM 030
	S 69	PSM 033
	S 103	PSM 005
57	S 23	PSM 027
58	S 64	PSM 031
59	S 56	PSM 014
60	S 68	PSM 032
	S 21	PSM 027
61	S 22	PSM 027
	S 24	PSM 027
62	S 62	PSM 030
	S 102	PSM 005
63	S 70	PSM 033
64	K 16	CHN 002
65	K 9	WIS 006
	K 31	WIS 003
66	K 32	WIS 003
	K 36	WIS 004
	K 1	WIS 001
	K 2	WIS 002
67	K 30	WIS 003
	K 34	WIS 005
	K 35	WIS 004
68	K 33	BET 027
69	K 3	BET 026
70	K 26	BET 024
71	K 27	BET 023
72	K 28	BET 025
	K 18	BET 018
73	K 19	BET 018
	K 20	BET 018
74	K 17	BET 018
	K 10	BET 017
	K 11	BET 017
75	K 12	BET 017
	K 14	BET 017
76	K 15	BET 017
77	K 13	BET 017
	K 21	BET 020
	K 22	BET 020
78	K 23	BET 020
	K 24	BET 019
	K 4	BET 015
	K 5	BET 016
79	K 6	BET 016
	K 7	BET 016
80	K 38	BET 029
81	K 25	BET 021
82	K 8	BET 022
	Y 7	BET 012
	Y 8	BET 012
83	Y 9	BET 012
	Y 10	BET 012
	Y 12	BET 012
	Y 13	BET 013
	Y 14	BET 013
	Y 15	BET 002
	Y 16	BET 003
83	Y 17	BET 004
	Y 18	BET 005
	Y 19	BET 005
	Y 20	BET 006
	Y 21	BET 006
	Y 22	BET 007
84	Y 11	BET 012
85	Y 5	BET 012
	Y 23	BET 008
86	Y 24	BET 009
	Y 25	BET 010
87	Y 6	BET 012
88	Y 26	BET 014
	Y 27	BET 011
89	Y 28	BET 030
90	Y 46	LIV 002
91	Y 1	LIV 001
	Y 2	LIV 003
92	Y 3	LIV 003
	Y 4	None
	Y 37	LIV 008
93	Y 38	LIV 008
	Y 39	LIV 008
	Y 40	LIV 004
94	Y 43	LIV 005
	Y 44	LIV 005
95	Y 29	LIV 008
	Y 30	LIV 009
	Y 31	LIV 010
	Y 33	LIV 011
	Y 34	LIV 011
96	Y 35	LIV 012
	Y 36	LIV 007
	Y 45	LIV 005
96	Y 32	LIV 010

find that some of the early Eskimo sites discovered by the Alyeska archeologists occur in the wooded interior many miles south of the Brooks Range divide in an area that during early historic times was part of the territory of one or more tribes of the Athapaskan Indians. Artifacts from these sites—which include K-8 and K-25 (Designations 82 and 81 on Map 2c) excavated under the direction of Mr. Charles E. Holmes—belong to what has been termed the Arctic Small Tool tradition (Irving 1962), which includes a number of artifact types previously found from Alaska to Greenland and which refers to the earliest known periods of Eskimo cultural development.

These archeological sites are not the first ancient Eskimo localities discovered within the forest zone, but they do occur farther south in the interior of northern Alaska than any others yet found. Thus, their discovery means that at one time Eskimo territory may have included more of the forest zone than we have hitherto suspected; or that during these Eskimo occupations this area was not forested and that the Eskimos, as in later periods, were accordingly exerting their influence across the northern tundra.

Further, and of equal interest, is the fact that a few of the stone tools discovered in these sites do not appear to represent early Eskimo artifact types. Instead, they resemble implements which archeologists ascribe to early northern Indian cultures. Although the ages of these sites, which seem to have contained a mixture of Eskimo and Indian artifacts, are not known, we believe they are at least several thousand years old. Possibly, therefore, the evidence from these localities argues either for a common origin of Eskimo and northern Indian societies, or for an Eskimo culture that has derived from an American Indian base. If the evidence argues for either possibility—at present one can speak only in terms of possibilities—the current major theory regarding the origin of Eskimo culture will require substantial revision.

Example 2. This example concerns what the pipeline archeological work has shown concerning possible former Athapaskan Indian occupations of the tundra. During the historic period, the Indians of northern Alaska lived in the forests, while nearly all of the Eskimos dwelt along the northern coasts and on the northern interior tundra. Ethnographic data imply that during the nineteenth century a group of Kutchin Indians inhabited tundra localities north of the central Brooks Range divide, but that they were eventually driven back into the forests by the Nunamiut Eskimos (Hall 1969). With almost this sole exception, however, both ethnographic and archeological evidence has led to the conclusion that the northern Alaskan Indians have been nearly exclusively restricted to the woodlands for many hundreds (if not several thousands) of years.

One previously discovered central Brooks Range archeological locality, which is generally thought to represent the prehistoric Athapaskan Indian culture, is the Kavik site (Campbell 1968). The Kavik site, which lies a few miles north of the present tree line in Anaktuvuk Pass (not on pipeline route), has been estimated to be a few centuries old, and its location has been interpreted to reflect a temporary incursion of a small hunting group of Indians who normally lived in the forests to the south.

The pipeline archeologists, however, discovered sites containing distinctive Kavik artifacts not only south of the Brooks Range divide—Site Y-17 (Designation 83 on Map 2c), excavated under the direction of Mr. Alan Boraas—but also

far out on the tundra as well—Sites S-78, S-40, and S-28 (Designations 4, 40, and 9 on Maps 2a and 2b), excavated under the direction of Mr. James Dixon. Indeed the northernmost of these (S-78) lies just a few miles south of the Arctic Ocean coast. A radiocarbon date implies that at least one of these Kavik localities found by the Alyeska crews was occupied 900 years ago. At that time, the forest and tundra zones of northern Alaska were in approximately their present positions. Again, therefore, these Alyeska discoveries may require us to revise our thinking concerning the former territories of Alaskan Indians and Eskimos.

Example 3. Mr. David E. Derry's analysis of archeological materials from Site S-81 (Designation 1 on Map 2a) illustrates a different type of result of the pipeline work (S-81 is the site where the fragment of *The Christian Science Monitor* was found). Mr. Derry was able to supplement the archeological finds with interviews of Ekimos who had visited the site when it was inhabited, or who had actually lived there and used the artifacts and features discovered.

The major interpretive objective of Mr. Derry at Site S-81 was to test the proposition that "specific patterns of human behavior [could] be reconstructed from the remaining archeological material." In spite of the recent age of the site, this task was not as simple as it may seem. The main feature, a sod house, had not been occupied since the late 1930's. Apparently, it had originally contained only a dirt floor. When it was excavated by the Alyeska crew, the original structure lay in ruins, and its contents were scattered. Before discussing with informants the various activities which had once been associated with this dwelling, Mr. Derry and his crew excavated its artifacts and mapped their locations. They also examined and mapped the various remaining components of the house and other nearby features, including refuse areas.

As examples of tentative interpretations derived from these data, Mr. Derry deduced that (1) one portion of the dwelling had served as a pantry, (2) the roof of the house had been constructed of hides, (3) a limited portion of the floorspace had been used by women in the manufacture of clothing, (4) men's manufacturing activities had been mainly conducted in a nearby structure, and (5) during or before the period of occupancy the men had adopted steel knife blades, whereas the women had continued to use slate blades in their ulus (women's knives).

An Eskimo informant who had once lived in the house subsequently confirmed some of these and similar interpretations, but he noted that others were incorrect. The combined archeological and ethnographic studies of Site S-81 therefore serve as an example of how the validity of deducing human behavior from prehistoric materials may be accurately measured.

Conclusions

A full appreciation of the value of the Alyeska archeological work must await not only further analysis and reporting of the data obtained, but also further intensive excavations in many parts of the Far North. Meanwhile, however, the work stands as a worthy instance of what can be accomplished by careful and detailed salvage archeology. It represents a pioneering effort, for no comparable salvage work had previously been attempted either in Alaska or in

northern Canada. Yet a high degree of professional competence is reflected in the Alyeska work. These studies should serve as a yardstick of archeological requirements in any future industrial development of the North American Arctic and Subarctic.

References

Campbell, J. M. 1966. "Radiocarbon dating and far northern archaeology." In *Proceedings of the 6th International Conference on Radiocarbon and Tritium Dating,* pp. 179-86.

_____ 1968. "The Kavik site of Anaktuvuk Pass, central Brooks Range, Alaska." *Anthropological Papers of the University of Alaska,* 14:33-42.

Hall, E. S., Jr. 1969. "Speculations on the late prehistory of the Kutchin Athapaskans." *Ethnohistory,* 16:317-33.

Irving, W. N. 1962. "A provisional comparison of some Alaskan and Asian stone industries." In *Prehistoric Cultural Relations Between the Arctic and Temperate Zones of North America,* J. M. Campbell (Ed.), Arctic Institute of North America, Technical Paper No. 11, pp. 55-68.

Wormington, H. M. 1957. *Ancient man in North America.* The Denver Museum of Natural History, Popular Series No. 4, Fourth edition, 322 pp.

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